

UltraSpan™
Integrated Antenna/Gain-controlled,
Bi-directional Amplifier

2.4-2.5 GHz ISM Band, 420 mW Version

User and Installation Manual

Important Notice: *This equipment complies with Part 15 of the U.S. FCC Rules and Regulations. Any changes or modifications, not expressly approved by the manufacturer, could void the user's authority to operate the equipment.*

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System Description

The UltraSpan™ antenna/amplifier system extends the operating range of broadband wireless systems operating in the 2400-2500 MHz spread spectrum band. The basic unit consists of a MICROCEPTOR® antenna and a built-in bi-directional amplifier operating in Time-Division Duplex (TDD) mode. It features intelligent algorithm and Automatic Gain Controlled (AGC) circuits which maintain transmit power and prevent transmit signal saturation, thus minimizing signal distortion.

The system also includes a universal power supply, a DC power inserter, and mounting hardware.

Applications

The UltraSpan system has applications in a wide range of wireless systems where TDD technology is used, such as Wireless Local Area Network (WLAN), Wireless Local Loop (WLL), Wireless Internet Access (WIA), and wireless modem connection with point-to-point systems.

Antenna

MICROCEPTOR Antennas are small, aesthetically pleasing antennas for broadband applications. They feature a patented feed design for excellent directivity in a low profile package.

Automatic Gain Control (AGC)

This key feature automatically detects the power level and adjusts the amplifier gain to allow for system variables. For example, the AGC adjusts for different interconnecting cable lengths and radio modems with different output powers. The AGC Transmit Amplifier is fully operational in a wide transmit input power range of 1 to 200 mW. An input signal of 2.5 mW delivers the maximum U.S. FCC specified power level. The AGC attenuates input signals greater than 4 dBm and maintains a maximum output power of 26.2 dBm.

Low Noise Amplifier

The amplifier is built into the back of the MICROCEPTOR antenna and is encased in a weatherproof enclosure. It features a low noise amplifier and an RF filter that decreases potential RF interference and overload caused by out-of-band frequencies, such as those received from higher power wireless communication systems.

Universal Power Supply

110/220 VAC to 7.5 VDC converter.

DC Power Inserter injects the 7.5 VDC onto the coaxial feeder cable to power the low noise amplifier.

Mounting Hardware

Standard Mounting Hardware consists of a mast clamp and L bolt. Optional Elevation Adjustable Mount is available.

Amplifier Comparison

The table compares the UltraSpan™ amplifier with other TDD antenna-mount amplifiers.

	ULTRASPAN™	Other TDD Amplifiers
Transmit gain	Intelligent self adjusted	Fixed
Transmit power level	Maintained	Varies, depending on input power level
Transmit signal distortion	Minimized at all times	Much worse at high input power levels
Input power range requirements	Wide range accepted	Designed for narrow range only
Amplifier Mounting Configuration	Built into the Antenna	Usually tower mounted requiring separate installation

Operation

The universal power supply provides the DC power; the radio modem supplies the RF signal. Both connect to the dc power inserter. The radio signal and the DC voltage are supplied to the antenna/amplifier via coaxial cable (not included). The antenna installs on a mast.

The system operates automatically and no user adjustments are required.

Features

- Automatic gain control minimizes signal distortion.
- Wide range of transmit input levels (1.4 mW to 200 mW).
- Low noise amplifier provides system noise figure of 3.5 dB.
- Universal, auto switching, 110/220 VAC to 7.5 VDC power adapter.
- Green LED indicates DC power on.
- DC ground for lightning protection.
- Power inserter equipped with surge protection.
- Industry standard "N" connectors ("F" connectors optional).
- Weatherproof, outdoor enclosure.

Typical System

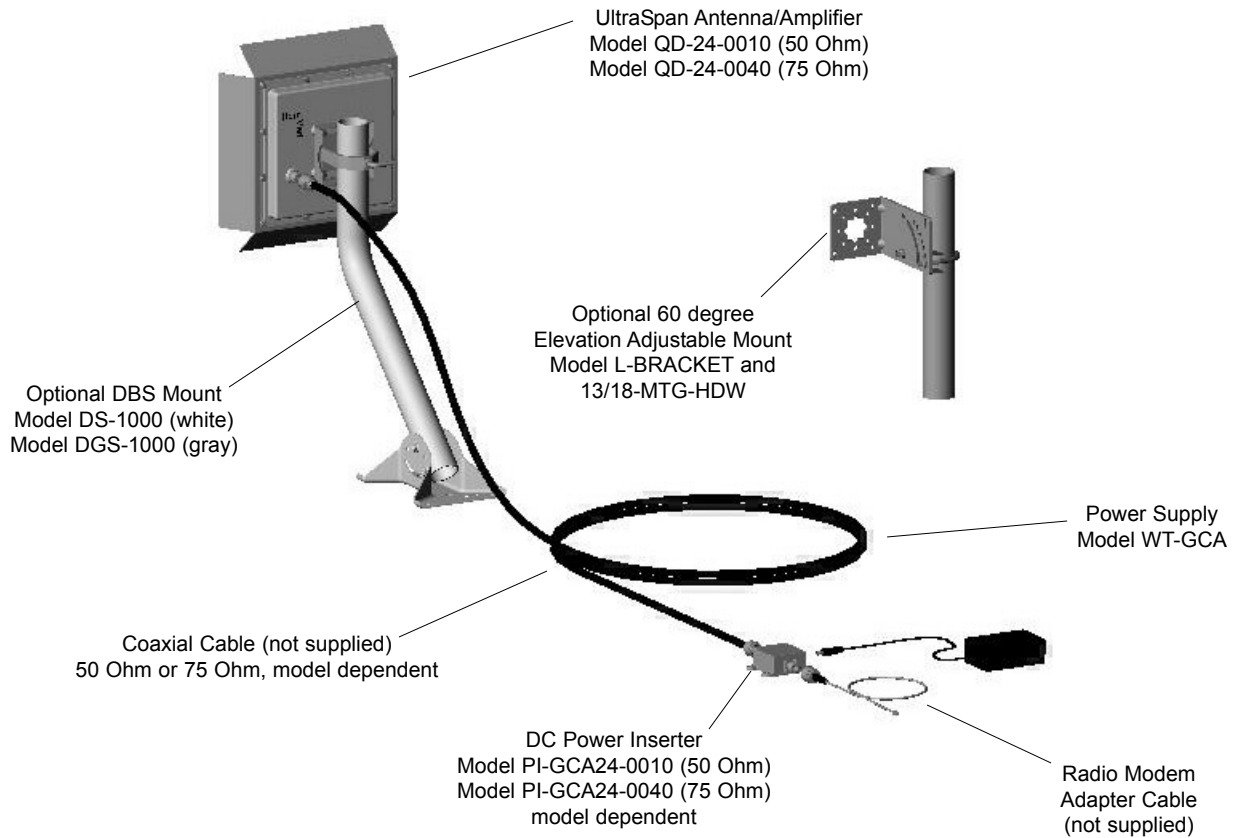


Figure 1 - Typical System

System Components

- UltraSpan™ Antenna/Amplifier
- Power Inserter
- Power Supply
- Connecting Cables (not supplied)
 - Radio Modem Adapter Cable
 - Antenna/LNA Feeder Cable
- Agere Systems PC LAN card (FCC ID.: IMRWLPCE24H)

The Power Inserter combines the RF signal from the Radio Modem (not shown) with the 7.5 VDC power from the Power Supply.

The combined DC power and RF signal are fed to the Antenna/Amplifier using coaxial cable (not included).

The Antenna/Amplifier mounts to a mast using the included mounting bracket.

Installation Instructions

Notice:

The installation, maintenance, or removal of antenna systems requires qualified, experienced personnel. Andrew installation instructions have been written for such personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance, and condition of equipment.

FCC exposure limits require minimum separation of 2 m between the user and the radiating elements.

Andrew disclaims any liability or responsibility for the results of improper or unsafe installation practices.

Mount Antenna

- 1 Select Antenna Polarization.** Use antenna polarity indicator on back cover (see Figure 2). Rotate antenna 90° to change polarity.

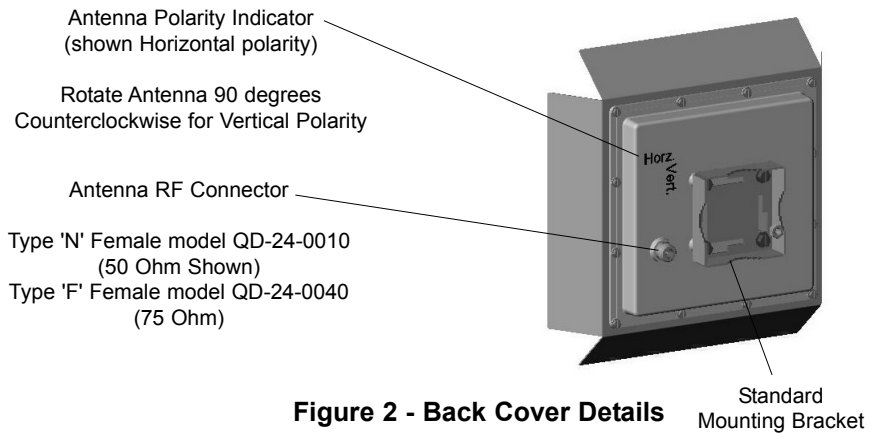


Figure 2 - Back Cover Details

- 2 Assemble Mast Clamp (Figure 3) to Mast Bracket.** Slide mast clamp legs into slot on mast bracket (Figure 4), then slide up to top of the slot (Figure 5).



Figure 3 - Mast Clamp

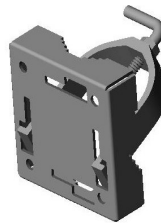


Figure 4 (Antenna Removed for Clarity)

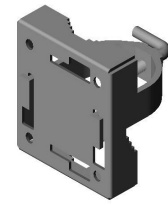


Figure 5 (Antenna Removed for Clarity)

- 3 Mount to Mast (Figure 6).** Slide unit with mast clamp over suitable mast (up to 2 inches) and secure with included L Bolt.

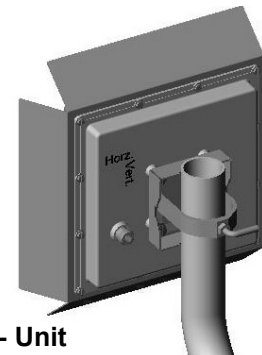


Figure 6 - Unit Mounted to Mast

Antenna Connections

4 **Connect Antenna Coax to Power Inserter (Figure 7).** Use coaxial cable equipped with two N male connectors (for 50-ohm models) or two F male connectors (for 75-ohm models). Cable and connectors are not supplied.

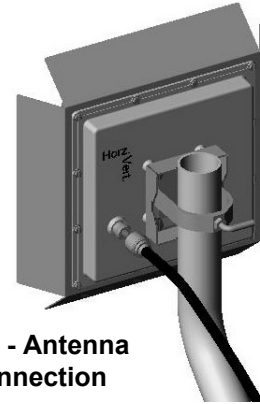


Figure 7 - Antenna RF Connection

DC Power Inserter Connections, Indicators, and Labels

The Power Inserter injects DC power into the RF cable. The power is carried to the amplifier with the RF signal via the Antenna Coax.

CAUTION: *Improperly connected cables may cause damage to the power inserter, radio modem, or another device in line between the power inserter and the radio modem.*

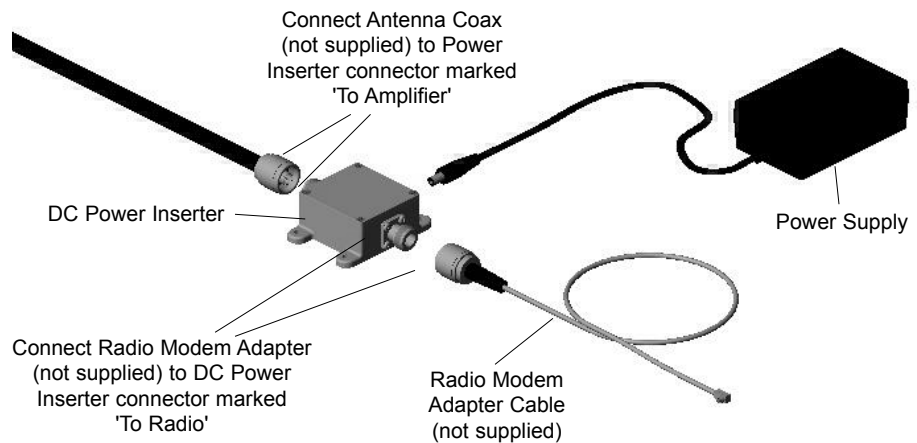


Figure 8 - DC Power Inserter Coax Connections

5 **"To Radio" Connection (Figure 8).** N female. Install Radio Modem Adapter Cable (not supplied) to connect the DC power inserter with the radio modem.

6 **"To Amplifier" Connection (Figure 8).** N female (50 ohm cable) or F female (75 ohm cable). Install Antenna/Amplifier Coaxial Cable (not supplied). The cable options are a 50-ohm cable with Type N male connectors or a 75-ohm cable with Type F male connectors, depending on the model chosen.

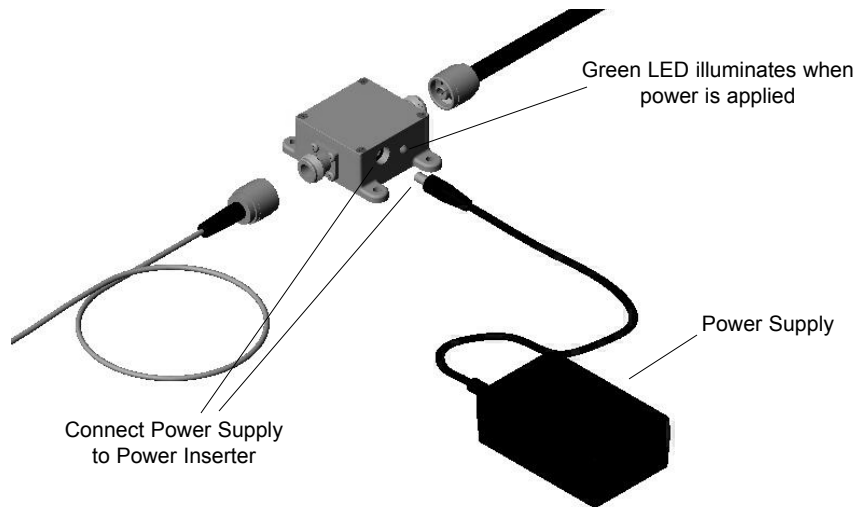


Figure 9 - DC Power Inserter Power Connection

7 DC Power Supply (Figure 9). Install the Power Supply and connect its cord to the Power Inserter. The power supply provided with the unit is a universal type, 110/220 VAC to 7.5 VDC converter. The Green LED on the Power Inserter indicates that dc power is on.

8 Antenna Signal Alignment. Direct the front of the antenna towards the desired signal and verify signal level. Elevation adjustment of the antenna may be necessary depending on proximity to system headend.

9 Waterproof the Antenna Connector. Once the unit is installed and tested, waterproof the antenna connector.

Operating Instructions

The unit operates automatically and no user adjustments are required.

The amplifier is designed for 2.4 GHz radios using Time Division Duplex (TDD) mode of operation. It is equipped with a high speed Tx/Rx switch that detects transmit signal and switches to transmit mode within 600 nano-seconds. In the absence of any transmit signal, the unit stays in receive mode. The amplifier cannot be used with a radio device that uses separate bands for transmit and receive in a true full duplex mode.

The system is currently approved for use with the following radio LAN cards:

□

1) Agere systems PC LAN FCC ID.: IMRWLPCE24H

Specifications

General

Frequency Band	2400 - 2500 MHz
Operating Mode	Bi-directional TDD
Maximum Transmit Output Power	+26.2 dBm (420 mW)
Transmit Input Power	0 dBm min, 23 dBm max
Transmit Gain	Automatically adjusts up to 23 dB
Antenna Gain	16 dBi \pm 1 dB
Receive Gain	14 dB
Frequency Flatness	\pm 1.0 dB
Noise Figure	3.5 dB
Lightning Protection	Ground connection at antenna port
DC Surge Protection	At 7.5 VDC input
Operating Temperature	-40°C to + 70°C
Power Supply	7.5 VDC at 0.7 amp
RF Connector	Type N, Female or Type F, Female
Dimensions	10.75" x 11"
Weight with Standard Mounting Kit	2.2 lb

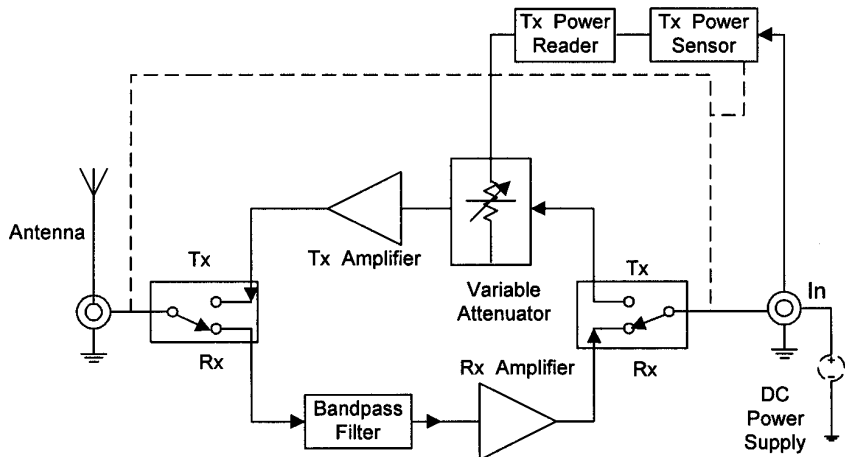
Transmit Power Gain at 2.45 GHz and 25°C

Input Level, at amplifier	Typical Output Level
1 mW (0 dBm)	250 mW
1.3 mW (1 dBm)	280 mW
1.6 mW (2 dBm)	330 mW
2 mW (3 dBm)	380 mW
2.5 mW (4 dBm)	420 mW
50 mW (17 dBm)	420 mW
100 mW (20 dBm)	420 mW
200 mW (23 dBm)	420 mW

Above 2.5 mW input, the amplifier attenuates the input signal power and maintains the output power typically at 420 mW.

CAUTION: Do not exceed 200 mW (+23 dBm) of input power to the amplifier.

Functional Block Diagram



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